REMARKS

Claims 1-21 were presented for examination, and claims 1-21 were rejected. Claims 1-21 are presently pending in this application, of which claims 1, 17, 19, 20 and 21 are independent. Applicant submits that pending claims 1-21 are in condition for allowance.

The following comments address all stated grounds of rejection. Applicant urges the Examiner to pass the claims to allowance in view of the remarks set forth below.

Claim Rejections under 35 U.S.C. §103

I. Claims 1-5, 16-18 and 20-21 Rejected under 35 U.S.C. §103 as Unpatentable over Kodosky in view of Chang

Claims 1-5, 16-18 and 20-21 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,901,221 to Kodosky et al. ("Kodosky") in view of U.S. Patent No. 5,627,979 to Chang et al. ("Chang"). Applicant respectfully traverses this rejection.

For ease of the discussion below, summaries of the claimed invention and the references of Kodosky and Chang are provided below.

A. Summary of Claimed Invention

The claimed invention is directed towards the use of a prelookup index search block to provide inputs to one or more interpolation blocks in a graphical block diagram modeling environment. A first prelookup index search block is connected to a second interpolation block. The prelookup index search block receives an input value indicative of an index into a lookup table for which to perform an index search operation. The lookup table comprises a set of numbers to search, also referred to as breakpoint data. The breakpoint data comprises an ordered

list of indexed values of length N which define a set of regions that correspond to a set of N-1 intervals.

The prelookup index search block performs an index search to generate information indicative of the location of the input value relative to the predefined indexed values that define regions in the breakpoint data. For example, the prelookup index search generates an integer value indicating the interval index, or region, where the input value resides, and a distance fraction specifying the normalized distance of the input value on the interval. This information is generated as output of the prelookup search index block, and received as input to the interpolation block. The interpolation block generates its output by interpolating table values of a first lookup table based on the information, e.g., interval index and distance fraction, fed into the interpolation block by each prelookup index search block. For example, the interpolation block may use an interpolation calculation such as $y = T(k) + f*(T(k+1) - T(k))$, where $k =$ the interval index and $f =$ the distance fraction from the prelookup index search block, to determine the output value of a first lookup table of T.

The technique of the present invention provides interpolation by reusing index search calculations for each breakpoint data set. Each of one or more interpolation blocks can share output values from the same prelookup index search block. As such, the specification of index search parameters can be specified centrally in a first prelookup index search block and the index search output provided to one or more second interpolation blocks. Therefore, the index search parameter calculations of the prelookup search index block can be performed once and the calculated information indicative of the location of the input value can be shared as inputs to one or more second interpolation blocks.

B. Summary of Kodosky

Kodosky is directed towards constructing virtual instrumentation to model physical

systems is the field of instrumentation. Kodosky describes computer-aided modeling of a

process using block diagram graphical modeling techniques. A block diagram editor is used to

develop a graphical representation of a program by linking together icons representing modular

procedural units. Kodosky uses block diagram modeling structures to facilitate data flow

techniques in the modeling process. Kodosky describes a virtual instrumentation model in the

graphical modeling environment to control an instrument, to acquire and analyze data from the

instrument, and to store and visually present that data. In contrast to the claimed invention,

Kodosky does not describe any prelookup index search or interpolation blocks.

C. Summary of Chang

Chang is directed towards a graphical user interface for mapping and accessing objects in

a data store such as a database. Chang describes the use of a high level Schema Mapping

Definition Language to define a mapping between an object schema and a data store schema, and

a graphical user interface to configure such a mapping. Chang does not discuss block diagram

modeling or the index search and interpolation blocks as in the claimed invention. In the

background information, Chang generally mentions the use of conventional data store

technology as the data model for mapping an object schema to the data store. In making

reference to the general data store technology, Chang mentions such technology may use

database indexing.

Conventional database technology may include indexed file systems and databases

wherein certain fields may be keys, or indexes, to identify a record. In these cases, a key may

comprise a combination of column fields in a row of a table that uniquely identify that record,

and the index provides pointers to the data values stored in specified columns of the table. A

database uses the index in a similar manner as an index in a book. The database searches the

index to find a particular value and then follows the pointer to the row containing that value.

This conventional database indexing does not perform the first block prelookup index search and

the second block interpolation calculations as in the claimed invention.

D.   Non-obviousness of Independent Claims 1, 20 and 21

Independent claims 1, 20, and 21 are directed to a method, program and system,

respectively. These independent claims recite a first block generating information indicative of a

location of an index value *relative to a predefined domain of possible index values that define*

regions, and a second block receiving the information from the first block to determine an output

value of a lookup table. That is, the first block provides information indicating the location of

the index relative to a region in a domain of index values. This relative index information is then

used by a second block to determine an output value from a lookup table by interpolating the

output value from the lookup table based on the information.

Kodosky in view of Chang does <u>not</u> teach or suggest a first block generating information

indicative of a location of an index value *relative to a predefined domain of possible index values*

that define regions, and a second block using the information to determine an output value of a

lookup table. In the Office Action, the Examiner indicates that Kodosky does <u>not</u> disclose the

indexing and lookup features recited in independent claims 1, 20 and 21. The Examiner cites

Chang for the purpose of suggesting that one ordinarily skilled in the art might modify Kodosky

to incorporate the method of using a lookup table and indexes as taught by Chang into the block

diagram data processing taught by Kodosky. However, all the claim limitations must be taught or suggested by the prior art. As with Kodosky, Chang does not teach or suggest a first block generating information indicative of a location of an index value *relative to a predefined domain of possible index values that define regions,* and a second block using the information to determine an output value of a lookup table.

Chang describes using conventional data modeling technology such as indexed file systems and databases. The indexes of Chang are pointers to records in a database, and a value of an index is searched to determine a pointer to a record in a database. Chang does not describe a first block generating information indicative of the location of one index *relative to a predefined domain of possible index values that define regions*, and a second block using the information to determine an output value of a lookup table. Rather, Chang simply determines a pointer to a database record from an index. In contrast, the claimed invention generates information indicative of a location of an index value *relative to a predefined domain of possible index values that define regions.* Furthermore, Chang does not discuss generating information indicative of the relative index location in a first block separate from and connected to a second block, and that the second block uses the generated information to determine an output value from a lookup table. Therefore, Chang fails to teach or suggest a first block generating information indicative of a location of an index value *relative to a predefined domain of possible index values that define regions*, and a second block using the information to determine an output value of a lookup table. As such, Chang fails to bridge the factual deficiencies of the Kodosky reference.

For the above discussed reason, neither Kodosky nor Chang, alone or in combination, discloses, teaches or suggests a first block generating information indicative of a location of an

index value *relative to a predefined domain of possible index values that define regions*, and a second block receiving the information from the first block to determine output value of a lookup table. Therefore, Applicant contends that Kodosky in view of Chang fails to detract from the patentability of independent claims 1, 20, and 21. Claims 2-5 and 16 depend on and incorporate all the patentable limitations of claim 1. Thus, Kodosky in view of Chang fails to detract from the patentability of claims 2-5 and 16. Accordingly, Applicant respectfully requests the withdrawal of the Examiner's rejection of claims 1-5, 16, 20, and 21 under 35 U.S.C. §103.

E. Non-obviousness of Independent Claim 17

Independent claim 17 is directed towards a method for processing a block diagram model that includes interpolation lookup blocks that perform index search operations and interpolated table lookup. The method includes detecting if the *interpolation lookup blocks* have shared input values and breakpoint data sets, and interpreting the block diagram model as if the interpolation blocks had separate input values and breakpoint data sets.

Kodosky in view of Chang does <u>not</u> teach or suggest processing a block diagram model that includes *interpolation lookup blocks* that have shared input values and breakpoint data sets. Neither Kodosky nor Chang discuss *interpolation lookup blocks* as in the claimed invention. Kodosky discusses a block diagram modeling environment for constructing a virtual instrumentation. As the Examiner indicates, Kodosky does <u>not</u> disclose, teach, or suggest *interpolation lookup blocks*. The Examiner cites Chang for the purpose of suggesting that one ordinarily skilled in the art might modify Kodosky to incorporate the method of using indexes as taught by Chang into the block diagram data processing taught by Kodosky. However, Chang does <u>not</u> disclose, teach or suggest *interpolation lookup blocks* as in the claimed invention.

Since each index points to a database record, Chang does <u>not</u> discuss any interpolation of an index. Therefore, Chang <u>fails</u> to bridge the factual deficiencies of the Kudosky reference.

For the above discussed reason, neither Kodosky nor Chang, alone or in combination, discloses, teaches or suggests processing a block diagram model that includes *interpolation lookup blocks* that have shared input values and breakpoint data sets. Therefore, Applicant contends that Kodosky in view of Chang fails to detract from the patentability of independent claim 17. Claims 18-19 depend on and incorporate all the patentable limitations of claim 17. Thus, Kodosky in view of Chang fails to detract from the patentability of claims 18-19. Accordingly, Applicant respectfully requests the withdrawal of the Examiner's rejection of claims 17-19 under 35 U.S.C. §103.

II. <u>Claims Rejected under 35 U.S.C. §103 as Unpatentable over Kodosky in view of Chang in further view of Admitted Prior Art</u>

Claims 6-15 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kodosky in view of Chang and in further view of Prior Art. Applicant respectfully traverses this rejection.

A. <u>Non-obviousness of Independent Claim 19</u>

Independent claim 19 is directed to maintaining in a block library an *interpolation block that uses output of one or more pre-lookup index search blocks*. That is, one pre-lookup index search block can feed the input of multiple interpolation blocks, and more than one pre-lookup index search block can feed the input of the same interpolation block. As such, the pre-lookup index search block can efficiently perform the same index search operation and share the output across multiple interpolation blocks.

Kodosky in view of Chang in view of Prior Art does not teach or suggest maintaining in a block library *an interpolation block that uses output of one or more pre-lookup index search blocks.* As discussed above, Kodosky in view of Chang does not teach or suggest the *interpolation block* and pre-lookup index search block of the claimed invention. Furthermore, Kodosky in view of Chang does not teach or suggest *an interpolation block that uses output of one or more pre-lookup index search blocks.* The Examiner cites the Prior Art to suggest that one ordinarily skilled in the art might modify Kodosky in view of Chang to maintain the index search block in a block library. However, all the claim limitations must be taught or suggested by the prior art. The Prior Art does not teach or suggest *an interpolation block that uses output of one or more pre-lookup index search block* as in the claimed invention. As depicted in Figures 1A and 1B of the specification for the present invention, the Prior Art uses look-up table blocks rather than an interpolation block *using the output of one or more pre-lookup index search blocks* as depicted in Figure 3. As such, the Prior Art does not disclose, teach or suggest maintaining in a block library an *interpolation block that uses output of one or more pre-lookup index search blocks.*

For the above discussed reason, neither Kodosky nor Chang nor the Prior Art, alone or in combination, discloses, teaches or suggests maintaining in a block library an *interpolation block that uses output of one or more pre-lookup index search blocks.* Therefore, Applicant contends that Kodosky in view of Chang in further view of Prior Art fails to detract from the patentability of independent claim 19. Accordingly, Applicant respectfully requests the withdrawal of the Examiner's rejection of claim 19 under 35 U.S.C. §103.

B. Non-obviousness of Dependent Claim 15

In addition to the patentable limitations recited in independent claim 1, dependent claim 15 recites further patentable subject matter of the first block *generating information comprising a breakpoint data set index value and distance fraction value for each corresponding input value*. That is, the pre-lookup search index block of the present invention determines a breakpoint data set index value and distance fraction for an input value relative to the breakpoint data set. The generated information of the breakpoint data set index value and distance fraction is provided as input into the interpolation block to determine an output value from a lookup table.

Kodosky in view of Chang in view of Prior Art does not teach or suggest *generating information comprising a breakpoint data set index value and distance fraction value for each corresponding input value*. As discussed above, Kodosky in view of Chang does not disclose, teach or suggest the interpolation block and pre-lookup index search block of the claimed invention. Furthermore, Kodosky in view of Chang does not disclose, teach or suggest generating in a pre-lookup search block *a breakpoint data set index value and distance fraction value for each corresponding input value*. The Examiner cites the Prior Art to suggest that one ordinarily skilled in the art might modify Kodosky in view of Chang to include an index search block. However, all the claim limitations must be taught or suggested by the prior art. The Prior Art does not teach or suggest an index search block that *generates information comprising a breakpoint data set index value and distance fraction value for each corresponding input value* as in the claimed invention. As shown in Figures 1A and 1B of the specification for the present invention, the Prior Art depicts a lookup table block that generates an output value. In contrast and as depicted in Figure 3, the claimed invention recites an index search block that *generates*

information comprising a breakpoint data set index value and distance fraction value for each corresponding input value. As such, the Prior Art does <u>not</u> disclose, teach or suggest an index search block that *generates information comprising a breakpoint data set index value and distance fraction value for each corresponding input value.*

For the above discussed reason, neither Kodosky nor Chang nor the Prior Art, alone or in combination, discloses, teaches or suggests an index search block that *generates information comprising a breakpoint data set index value and distance fraction value for each corresponding input value.* Therefore, Applicant contends that Kodosky in view of Chang in further view of Prior Art fails to detract from the patentability of claim 15. Accordingly, Applicant respectfully requests the withdrawal of the Examiner's rejection of claim 15 under 35 U.S.C. §103.

C. <u>Non-obviousness of Dependent Claims 6-14</u>

As discussed above, Applicant contends that independent claim 1 is patentable and in condition for allowance. As such, claims 6-14 dependent on and incorporating all the patentable limitations of independent claim 1 are patentable and in condition for allowance. Accordingly, Applicant respectfully requests the withdrawal of the Examiner's rejection of claims 6-14 under 35 U.S.C. §103.

CONCLUSION

In view of the remarks set forth above, Applicant contends each of the presently pending

claims in this application is in immediate condition for allowance. Accordingly, Applicant

respectfully requests the Examiner to pass the claims to allowance.

If the Examiner deems there are any remaining issues, we invite the Examiner to call the

Applicant's Attorney at the telephone number identified below.

Respectfully submitted,
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